



# Directed Audio Sound System

MODEL: SpotDAP450



SpotDAP450

## Service Procedures

There are no user serviceable parts within the SpotDAP sound system unit. Should the unit cease to function, it must be returned to your SpotDAP provider or to RSF for repair or replacement.

## Warranty Statement

Refer to the separate warranty card provided with this manual.

## Contact RSF

Before contacting RSF directly, please contact your SpotDAP provider. They should know more about your particular installation and may be in a position to provide faster service.

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# USER'S MANUAL

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## Important Safety Instructions

### WARNING

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

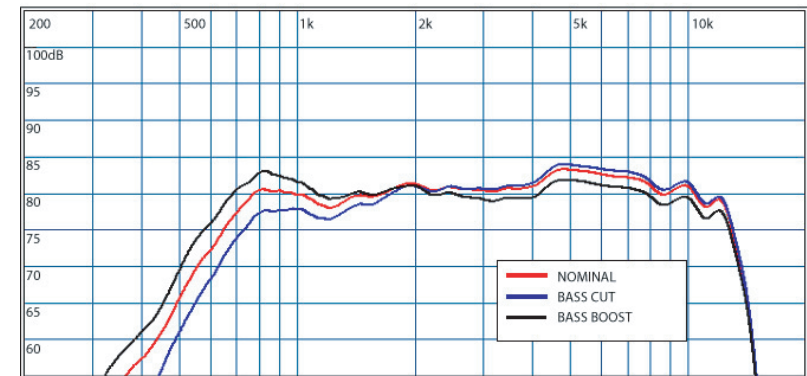


This symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



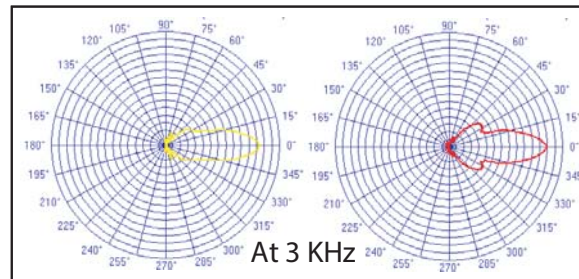
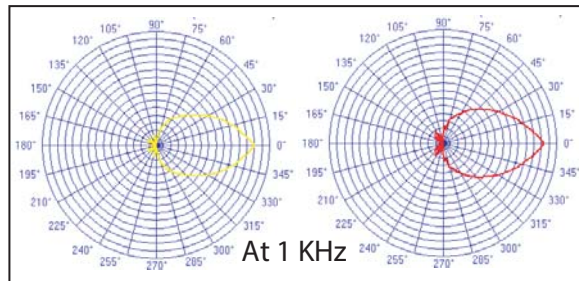
This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

SpotDAP450 Frequency Response

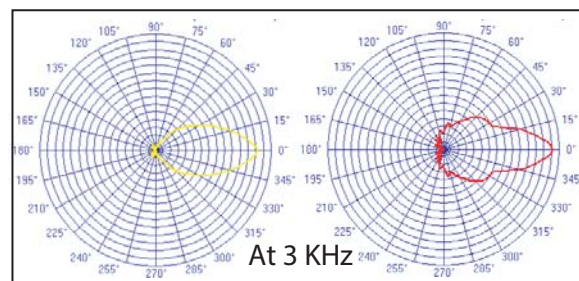
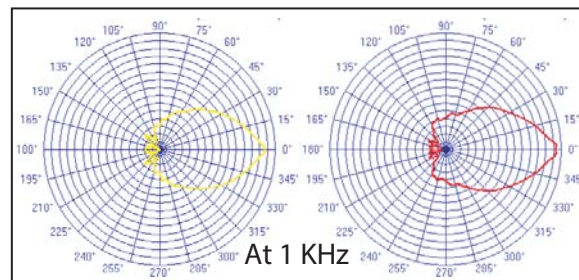


## Performace Charts (cont'd)

Polar Plot – SpotDAP450 (Horizontal Placement)



Polar Plot – SpotDAP450 (Vertical Placement)



- 1) Read these instructions.
- 2) Keep these instructions.
- 3) Heed all warnings.
- 4) Follow all instructions.
- 5) Do not use this apparatus near water.
- 6) Clean only with dry cloth.
- 7) Do not block any ventilation openings. Install in accordance with manufacturer's instructions.
- 8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that product heat.
- 9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit your outlet, consult an electrician for replacement of the obsolete outlet.
- 10) Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- 11) Only use attachments/accessories specified by the manufacturer.
- 12) Unplug this apparatus during lightning storms or when unused for long periods of time.
- 13) Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- 14) **WARNING:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
- 15) **WARNING:** Use this product only with an outlet that provides a protective earthing connection.
- 16) DO NOT allow foreign objects to pass through the grill face or touch the emitter.

## IMPORTANT SAFETY INSTRUCTIONS

17)  **CAUTION:** DO NOT operate unit with the front grill removed.

18) Keep a 3-inch minimum spacing distance around the apparatus for sufficient ventilation.

19) Due to the potential of extreme temperatures, do not place this unit in direct sunlight for extended periods of time.

20) Medical research indicates that the levels of ultrasound used in the SpotDAP device are not harmful. As you would with any loudspeaker, it is recommended that you follow prudent safety procedures.

21) For best results when operating the SpotDAP unit in "Direct Mode" (pointed directly towards the intended listener) it is recommended that you maintain a distance greater than 6 feet (~ 2 meters) between the SpotDAP unit and the listener.

22) This product is approved for indoor use only.

23) Do not expose apparatus to dripping or splashing. Do not place objects filled with liquids, such as vases, on the apparatus.

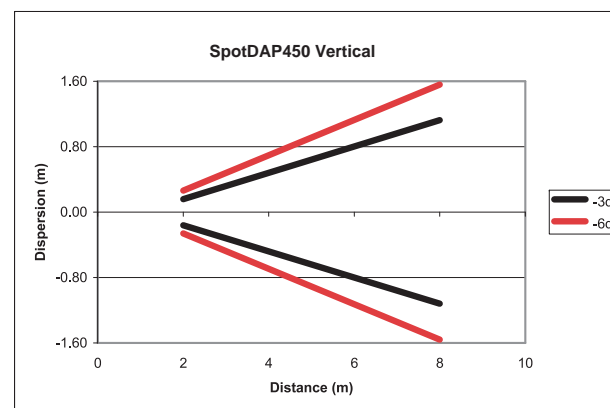
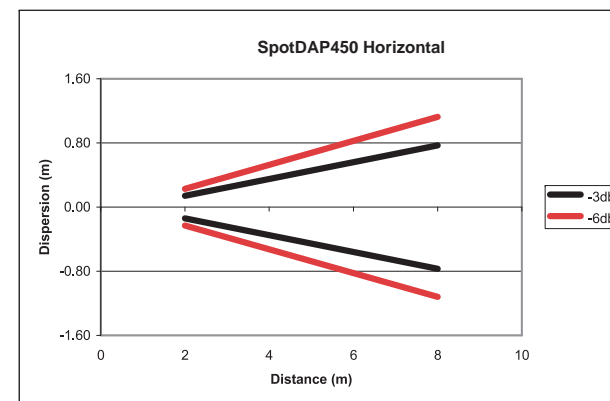
24) At no time should you aim the emitter directly into the ear canal of an individual at less than 3 feet (~ 1 meter) distance.

25) DO NOT exceed the storage and operating temperature of the SpotDAP unit (see page 18).

## GENERAL SPECIFICATIONS

### Performance Charts

Beam dispersion at 3KHz.



## GENERAL SPECIFICATIONS

### SAFETY REGULATIONS (cont'd)

- OSHA (USA) OSHA Technical Manual, Section III, Chapter 5, Section V, Table III: 5-4  
"TLV's For Ultrasound"
- FDA (USA) the FDA has assigned the following Accession Numbers to the SpotDAP (HSS) products: 0181485 and 0191486.
- FCC This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and the receiver.
  - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
  - Consult the dealer or an experienced radio/TV technician for help.

**Packaging Specifications** The packaging for SpotDAP is suitable for common parcel shipment. It meets the International Safe Transit Association Procedure 1A pre-shipment test specifications. Structures and methods utilized in this system are patented under one or more US and International patents. Additional US and International patents pending. US 6,606,389 US 6,011,855 US 6,577,738 US 6,466,674 US 6,229,899 US 6,108,427 US 5,889,870 US 6,584,205 US 6,359,990

## UNPACKING AND INSPECTION INSTRUCTIONS

### Unpacking the Carton

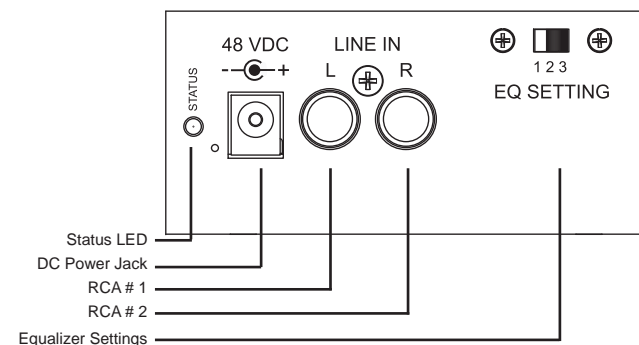
Carefully remove the SpotDAP unit from the packaging carton. Gently remove the protective bag from around the unit. Be particularly careful not to bend or deform the front emitter surface or allow any foreign objects to come into contact with the emitter surface (the silver/copper foil surface behind the front grill).

### Items Included:

- (1) SpotDAP Audio Sound System unit (model # is indicated on the rear panel)
- (1) User's Manual
- (1) Warranty Card
- (1) AC Power Cord
- (1) AC/DC Power Supply

Carefully inspect the device for any obvious physical damage. If there is evidence of any damage, STOP. Do not plug the device into AC power. Do not attempt to operate the unit. Immediately file a damage claim with the delivery carrier. Contact RSF for repair or replacement instructions. Retain all packing materials.

### SpotDAP Unit Controls Identification:





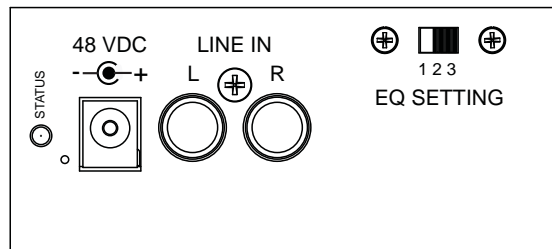
## OPERATING INSTRUCTIONS

### Controls

**NOTE:** It is strongly suggested that all audio connections are made with the SpotDAP unit's power turned off.

Audio Input:

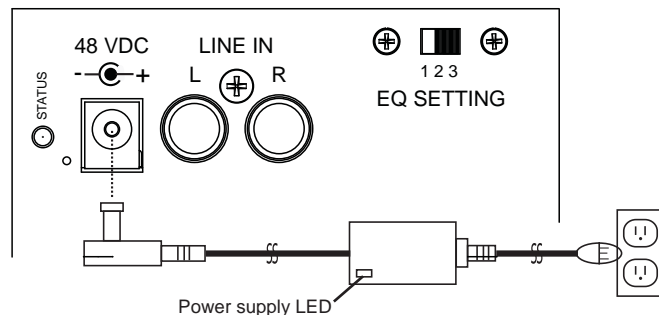
Unbalanced audio inputs are connected to the two RCA connectors.



The SpotDAP unit is designed to accept line level stereo audio inputs from various CD, stereo, or multimedia devices. The SpotDAP unit internally sums the stereo input. One or both of the RCA connectors can be used to input an audio source. See page 16 for acceptable audio input levels.

Connecting Power:

Make sure the AC cord is properly plugged into the AC/DC power supply. Then plug the DC jack into the SpotDAP unit. Plug the AC plug into a properly grounded AC outlet. The Status LED indicator on the SpotDAP unit will display green indicating the SpotDAP unit is on and functioning. There is no power switch on the SpotDAP unit. The SpotDAP unit will automatically turn on if the AC/DC power supply is on. The LED on the AC/DC power supply will display green if AC power is present.



## GENERAL SPECIFICATIONS

### ENVIRONMENTAL

Operating Temperature: 0°C to 40°C (32°F to 104°F)  
 Storage Temperature: 0°C to 50°C (32°F to 122°F)  
 Operating Humidity Range: 0 to 95% (non-condensing)  
 Storage Humidity Range: 0 to 95% (non-condensing)

### SAFETY REGULATIONS

CSA For Professional Use Only

CE Low Voltage Directive 73/23/EEC (including amendments)  
 EMC Directive 89/336/EEC

EN60065 (1998)	Safety for Audio/Video & Musical Instruments Apparatus for Household, Commercial, and Similar General Use
EN55103-1	Emissions tests
EN55022 (1998)	Conducted Emissions
EN55103 (1996)	Radiated Disturbance Power
EN55103-1, Annex A	Radiated Magnetic Fields
EN55103-1, Annex B	Inrush Current Measurements
EN61000-3-2 (1995)	Powerline Harmonics
EN61000-3-3 (1995)	Powerline Flicker
EN55103-2	Immunity tests
EN55014 (1993)	Discontinuous Disturbance ("Click") test
EN61000-4-2 (1995)	Electrostatic Discharge Immunity
EN61000-4-3 (1995)	Radio Frequency Immunity
EN61000-4-4 (1995)	Electrical Fast Transient Burst Immunity
EN61000-4-5 (1995)	Power Line Surge Immunity
EN61000-4-6 (1994)	RF Common Mode Immunity
EN61000-4-11 (1994)	Voltage Dips & Short Interruptions Immunity
EN55103-2, Annex A	Magnetic Fields
EN55103-2, Annex B	Audio Frequency Common Mode

ELECTRICAL

AC Power Cord Length 1.83 m (6 ft.)

POWER REQUIREMENTS

Wattage: 100 watts maximum

ELECTRICAL RATINGS

Input 100V~240V AC

Universal power supply, 50V~60 Hz

Output 48V DC @ 1.5 Amps maximum

MECHANICAL

Physical Dimensions: Depth (Front-Back) Height (Top-Bottom) Width (Left-Right)

SpotDAP450 3.47" x 5.96" x 12.25"

88.1mm x 151.4mm x 311.1 mm

SHIPPING WEIGHT (Approximate)

SpotDAP450 6lbs

UNIT WEIGHT

SpotDAP450 2.2 lbs

Volume:

Volume is controlled by the audio source device.

The SpotDAP unit is designed to accept line level stereo audio input into the RCA style connectors from audio sources such as CD players, DVD players, stereos, or other multimedia devices. These devices must have volume control in order to adjust the output level of the SpotDAP unit.

When the SpotDAP unit detects that the incoming signal is greatly beyond the input rating of the unit, it automatically lowers the signal until the user can adjust the input level to within limits. The Limiter recovery is typically only for a few seconds. Adjust source volume level to reduce limiting frequency for the most consistent output volume. The Status LED will flash red when the limiter is working.

## Operating the SpotDAP Unit

Connect the AC/DC power supply to the SpotDAP unit first, then to the correct voltage power source. The SpotDAP unit will automatically turn on. The Status LED will show green. See page 5 for more detail in connecting the AC/DC power supply to the SpotDAP unit.

Adjusting the SpotDAP unit volume:

**NOTE:** It is always best to begin with a low volume level at the source.

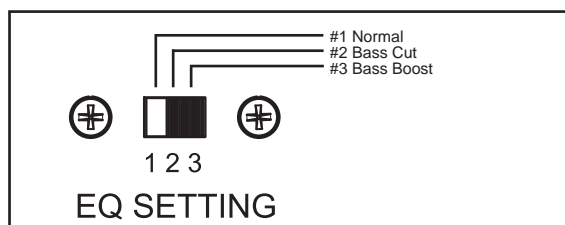
The SpotDAP unit requires audio from a line level external audio source, with volume control such as a CD player, DVD player or MP3 player.

- Stop the external audio source.
- Connect the RCA cables.
- Turn the external audio sound on.
- Adjust the external audio source's volume until you reach the desired level from the SpotDAP unit.

When the SpotDAP unit detects that incoming signals are significantly beyond the input rating of the unit, it automatically lowers the signal until the limiter can reduce the input level to within operating limits.

Adjusting the SpotDAP EQ settings:

The SpotDAP unit comes programed with 3 selectable EQ settings. See page 22 for frequency response plots showing the effect of each EQ setting. The factory default is EQ setting #1.



## SYSTEM MODEL Nos. SpotDAP450/SpotDAP460

### ULTRASONIC & DSP PROCESSING

Carrier Frequency: Variable 40 - 50 kHz

Modulation Method: Proprietary Dynamic Double Sideband

### ULTRASONIC EMITTER

Type: Proprietary Monolithic Film Transducer

### AUDIO

Analog Input Section:

Input Impedance: 10k Ohms

A/D Converter: 16 bit

Input Connector: 2 RCA style connectors

Input Channels: RCA1, RCA2

System Configuration: Monaural (Two input channels summed together on the RCA connectors)

Max Input Level Before Clipping: 160 mVrms x1 channel or 80 mVrms x 2 channels

System:

Bandpass Filtering: 400Hz to 16KHz

Max Audio SPL Output: SpotDAP450 85db @ 1KHz/1 meter  
SpotDAP460 91db @ 1KHz/1 meter

### POWER AMPLIFICATION (ALL UNITS)

Amplifier Type: Proprietary Modulation Amplifier (MODAMP®)



## APPLICATIONS

The power to restrict sound to a specific area without imposing on nearby activities has endless possibilities for use. The SpotDAP uses HyperSonic Sound® (HSS®), a pioneering sound-generation technology that gets your audio message right to your audience. The HSS technology, a highly directional ultrasonic column places sound only where it is intended. Sound does not spread to the sides or rear of a SpotDAP unit, eliminating the problem of uncomfortable and unwanted noise pollution produced by conventional speakers.

- Directory kiosks in a shopping mall
- Store displays introducing a new product
- Art display information directed to patrons at art museums
- Directions at an amusement park
- Display booths at trade shows
- Speakers in an office space
- Internet access kiosks in public areas
- Audio/video conferences in different languages from a single device
- Point-of-purchase advertising, or language-department messaging
- Providing hearing impaired sections in churches and schools

HSS technology can be used anywhere noise abatement requirements preclude general broadcast address, but communications are required.

SpotDAP can transform signs, placards, and surfaces into virtual speakers. Virtual Mode applications allow units to be placed without cabinet or hardware at the desired sound location. By projecting sound with a SpotDAP unit, a simple display sign can act as a speaker without wiring or changing the sign's appearance. You can beam the SpotDAP sound to specific endcaps or aisle displays or send sound across the room, without uncomfortable and unwanted volume from loudspeakers. SpotDAP can turn a wall into an information sound center by adding sound to coupon panels and directional signage to increase interest.

The superior control that SpotDAP offers will grant freedom to use sound as never before to audio engineers, architects and environmental designers. Audio use will be well-defined and more impactful with highly controlled audio placement, selective access to that audio, and freedom from the need to use high levels of sound to get audio across a distance.

## MAINTENANCE



Maintain the environmental requirements as outlined in the section on Installation and Setup, and the Safety Instructions.

### Cleaning

Keep the SpotDAP unit free of dust accumulation. To clean the emitter surface, use only low pressure (less than 10 PSI) compressed air, available in small spray cans from an electronics store. Use only a dry cloth to remove dust from the exterior of the SpotDAP unit. DO NOT attempt to clean the surface of the emitter with anything other than compressed air at less than 10 PSI.

### Servicing the HSS unit

The SpotDAP unit has no user-serviceable parts. Contact RSF if service is required.

RSF (France)

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F-31500 TOULOUSE FRANCE

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E-MAIL: info@rsf-int.com

[www.rsf-int.com](http://www.rsf-int.com)

## NOTE:

**CAUTIONS ON HANDLING:** Use caution when handling the device. Be sure that no foreign objects come into contact with the emitter surface (the silver/copper foil surface behind the front grill).

## Set-up Environment

### Temperature:

Do not expose the SpotDAP unit to direct sunlight for extended periods as the emitter in the SpotDAP unit can be damaged by extremes of heat or cold. Observe and maintain the temperature limits as described in the General Specifications section, page 18.

### Humidity:

Avoid direct exposure to water. If the SpotDAP unit is moved and the temperature change causes condensation on the unit, allow the emitter surface to dry, unaided, before applying power. Observe and maintain the humidity limits as described in the General Specifications section, page 18.

### Vibration:

Any electronic device can be affected by excessive vibration. Although the SpotDAP unit is not particularly sensitive to vibration, use sound judgment as you would when installing any electronic device.

### Dust and Dirt:

Avoid installing the SpotDAP unit where the emitter will be subjected to excessive dust and dirt. See the Maintenance section (page 8) for details on managing environmental dust. Contact SpotDAP Service at +352 49.74.20.40 or support@rsf-int.com for information on operating the SpotDAP unit in an excessive dust or dirt environment.

### Ventilation:

Keep the SpotDAP unit's vents unblocked. A minimum clearance of 3 inches (7.5 cm) should be maintained to allow unrestricted ventilation with convected airflow.

## Technical Engineering Questions

### *How much AC power is needed?*



See the General Specifications section on page 17 for power requirements

### *Does feedback occur using a live microphone with a SpotDAP system?*

SpotDAP systems allow you to direct the produced audio away from any live microphone, significantly reducing the tendency for feedback. Additionally, SpotDAP signal processing further reduces the potential for feedback.

### *What governmental or safety agency approvals are required for SpotDAP?*

SpotDAP systems manufactured for RSF by American Technology Corporation (ATC) will meet and/or exceed the following government and safety requirements and regulations:

- CSA  For Professional Use Only
- CE 
- OSHA (USA) OSHA Technical Manual, Section III, Chapter 5, Section V, Table III: 5-4 "TLV's For Ultrasound"
- FDA (USA) American Technology Corporation (ATC) has submitted the applicable reports to the FDA pursuant to Title 21, CFR, subchapter J as it pertains to ultrasonic devices for other than medical device applications. The abbreviated report is pursuant to Section 1002.12 of the regulations. According to this report, the FDA has assigned the following Accession numbers to SpotDAP (HSS®) products: 0181485 and 0191486.
- FCC (USA) This device complies with the FCC Rules for a Class A Digital Apparatus.

## SpotDAP Commercialism

### *How loud is SpotDAP?*

At the current stage of development, SpotDAP can produce in excess of 85 dB of peak audible sound at 1 meter.

### *How does SpotDAP mount to a wall or other location?*

A standard mounting bracket is available. However, many users provide their own mounting brackets designed specifically for their unique application.

### *Are there any mounting restrictions?*

SpotDAP can be mounted just about anywhere indoors, provided the environmental specifications are met. SpotDAP should be mounted securely so it remains "focused" or "aimed" in the correct direction. SpotDAP has no rear sound wave, and can be mounted directly on a wall or other hard surface when adequate ventilation is provided. SpotDAP can also be embedded inside other displays.

### *What is the usable frequency bandwidth of the audio?*

Audio bandwidth is dependent primarily on the maximum audio SPL required and secondarily on the size of the emitter array. The useful frequency range is 400 Hz - 16 kHz. There are 3 EQ settings to adjust the audio tone of the SpotDAP unit under different operating conditions.

### *What is the warranty period?*

SpotDAP systems from RSF are provided with a one-year limited warranty.

### *How do I get SpotDAP service if required?*

Please call RSF Technical Service at +352 49.74.20.40 or email [supportl@rsf-int.com](mailto:supportl@rsf-int.com) to obtain authorization (RMA #) to return the unit for repair or replacement. See the warranty card provided with the SpotDAP unit for additional information.

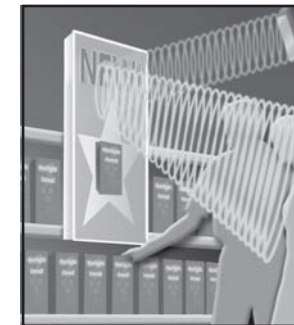
Select an installation location that is consistent with the various environmental concerns on pages 2 and 3. Determine which mode the SpotDAP unit will be used in before selecting a location. Virtual Mode will require an unbroken line of approach from the emitter of the SpotDAP unit to the area being used as a virtual speaker. Direct Mode requires a clear line of approach from the SpotDAP unit to the point where the listener will be while hearing the audio. To restrict the audio only to those in a specific area, use Direct Mode. Place the SpotDAP unit so that the emitter is pointed at the spot where you wish audio to be heard. For maximum isolation of the sound point, consider mounting the SpotDAP unit directly overhead of the listening point.

If listeners who are near a sign, display or other object are to hear the sound as though a speaker was at that location, use Virtual Mode. This requires that a surface suitable for reflecting the HSS ultrasound be present at the location.

Once the location for the SpotDAP unit is selected, choose the appropriate mounting hardware. Provide access for the audio source cables and AC/DC power supply.



Direct Mode



Virtual Mode

## Troubleshooting

If the SpotDAP unit does not generate sound:

- Check green LED is on at SpotDAP I/O panel
- Check that the AC/DC power supply is on and the DC plug is in the SpotDAP unit.
- Check the volume level of your external audio source.
- Unplug the AC power, check the audio input connectors at the SpotDAP unit and source connection points, wait one minute and plug the AC power back in.
- Unplug the AC power and check that there is source material (CD, DVD, tape, etc.) in the audio source device. Check that the audio source device is on. Check that the volume control of the audio source device is not turned to minimum or off. Wait one minute and plug the AC back in.

## Frequently Asked Questions

*The SpotDAP uses the HSS technology, but what is HSS?*

HyperSonic® Sound (HSS®) is a proprietary parametric sound generator, developed and refined in the labs of American Technology Corporation(ATC). The SpotDAP is based on the HSS technology and is manufactured by ATC to RSF's specifications. The SpotDAP offers many advantages over conventional loudspeaker systems.

*What is a parametric sound generator?*

A parametric sound generator produces directional audio from ultrasonic sound that we can hear. SpotDAP is an advanced type of a parametric sound generator.

*What are the advantages of SpotDAP sound reproduction systems over conventional loudspeakers?*

SpotDAP creates a very directional beam of sound, similar to the light from a flashlight, which can be controlled and directed as desired. This directional focus can be used to:

- Deliver sound to a specific area or person
- Deliver sound to areas which are either physically impossible to access or too costly to install conventional loudspeakers (create virtual sound sources)
- Move sound around a room in real time

*What is a virtual sound source?*

A virtual sound source creates the illusion of sound coming from a surface or direction where no physical loudspeaker is present. The place from which the listener perceives the sound to be coming is called a Virtual Loudspeaker or a Virtual Sound Source.

*How does SpotDAP operate differently from conventional loudspeakers?*

SpotDAP produces sound using highly directional ultrasonic frequencies. This sound is sent to the specific location where it is to be heard. Conventional loudspeakers generate audible sound which can only originate from the loudspeaker location, and which radiates in all directions. SpotDAP provides greater control of sound placement and volume.

*What are some typical applications for SpotDAP technology?*

Refer to the Applications section on page 15 for examples of different SpotDAP applications.

*What is the diameter and the directivity of the ultrasonic beam and what affects it?*

The ultrasonic beam is comparable in diameter to the active surface area of the SpotDAP emitter array. See the Audio Dispersion charts on page 20 for the SpotDAP450 and SpotDAP460 to understand the beams' dispersion over distance. The ultrasonic beam follows the dispersion chart until it hits a reflective surface.

The directivity of the SpotDAP unit allows intelligible audio to be heard at 25 meters or more under ideal conditions. The audio source content and ambient background noise level will impact this distance. Contact an RSF Applications Engineer at +352 49.74.20.40 or support@rsf-int.com for more information.